Aminopeptidase N is a target for a very rapid IgA response upon a primary oral immunisation.

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Enteroxigenic Escherichia coli (ETEC) are a major cause of diarrhoea in man and animals. In piglets, ETEC, which produce F4 fimbriae, are responsible for severe diarrhoea and presence orabsence of receptors for F4 (F4R) determines sensitivity for infection. The F4R is needed for the protective immune response seen after oral administration of the fimbriae. We identified porcine aminopeptidase N (pAPN) as an F4R involved in clathrin-mediated endocytosis of F4 by comperative proteomic analysis of brush border proteins of receptor positive and receptor negative animals and using pAPN-transfected cells. Binding to pAPN depended on sialic acid containing carbohydrate structures. Endocytosis could also be induced in vitro as well as in vivo using APN-specific rabbit antibodies. Oral immunisation of pigs with the antibodies combined with choleratoxin rapidly resulted in a rabbit antibody-specific IgA response already reaching its plateau 7 days (mean titer of 240) after the immunisation, whereas pigs immunised with irrelevant rabbit antibodies showed a peak titer of 80 one week after a secondary immunisation. In conclusion, APN was identified as interesting target for oral immunisations.